CLAIMS:

1. An apparatus for determining a propagation time delay, comprising:

at least one source adapted to generate at least one modulated Doppler invariant signal;

at least one receiver deployed along a seismic sensing cable, wherein the receiver is adapted to receive at least one modulated Doppler invariant signal from the at least one source; and

a signal processing unit adapted to determine the propagation time delay between the source and the receiver using the modulated Doppler invariant signal and the received modulated Doppler invariant signal.

2. The apparatus of claim 1, wherein the modulated Doppler invariant signal is a modulated linear-period-modulated signal.

3. The apparatus of claim 2, wherein the modulated linear-period-modulated signal has a bandwidth of about 16 kHz and a temporal duration of about 0.25 seconds.

4. The apparatus of claim 1, wherein the signal processing unit is adapted to determine the propagation time delay between the source and the receiver by cross-correlating the modulated Doppler invariant signal and the received modulated Doppler invariant signal.

5. The apparatus of claim 4, wherein the signal processing unit is adapted to determine the propagation time delay between the source and the receiver by auto-correlating the modulated Doppler invariant signal.

6. The apparatus of claim 1, wherein the at least one source is adapted to generate the plurality of modulated Doppler invariant signals as a plurality of separable Doppler invariant signals.

7. The apparatus of claim 6, wherein the at least one source is adapted to generate the plurality of separable Doppler invariant signals as a plurality of orthogonal Doppler invariant signals.

8. The apparatus of claim 7, wherein the at least one source is adapted to generate the plurality of orthogonal Doppler invariant signals using a plurality of orthogonal sequences.

9. The apparatus of claim 8, wherein the plurality of orthogonal sequences are at least one of a plurality of Maximal sequences and a plurality of Kasami sequences.

10. The apparatus of claim 6, wherein the at least one source is adapted to generate the plurality of separable Doppler invariant signals substantially simultaneously.

11. The method of claim 6, wherein the at least one source is adapted to generate the plurality of separable Doppler invariant signals with a time delay between each of the plurality of separable Doppler invariant signals.

12. The apparatus of claim 6, wherein the at least one source is a first source adapted to generate the plurality of separable Doppler invariant signals.

13. The apparatus of claim 6, wherein the at least one source is a plurality of physically separate sources adapted to generate the plurality of separable Doppler invariant signals.

14. The apparatus of claim 1, wherein the signal processing unit is adapted to determine a distance between the source and the receiver using the propagation time delay.

15. The apparatus of claim 1, wherein the at least one source is deployed near the surface of a body of water.

16. The apparatus of claim 15, wherein the at least one source is deployed on at least one of a buoy, a vessel, and a towed cable.

17. A method for determining a propagation time delay, comprising:

generating at least one modulated Doppler invariant signal using at least one source;

receiving the at least one modulated Doppler invariant signal with at least one receiver positioned along a seismic cable; and

determining at least one propagation time delay from the source to the receiver using the modulated Doppler invariant signal and the received Doppler invariant signal.

18. The method of claim 17, wherein generating the modulated Doppler invariant signal comprises generating a linear-period-modulated signal.

19. The method of claim 18, wherein generating the linear-period-modulated signal comprises generating the linear-period-modulated signal having a bandwidth of about 16 kHz for about 0.25 seconds.

20. The method of claim 17, wherein determining the propagation time delay from the source to the receiver using the modulated Doppler invariant signal and the received Doppler invariant signal comprises cross-correlating the modulated Doppler invariant signal and the received Doppler invariant signal.

21. The method of claim 17, wherein determining the propagation time delay from the source to the receiver using the modulated Doppler invariant signal and the received Doppler invariant signal comprises auto-correlating the modulated Doppler invariant signal.

22. The method of claim 17, wherein generating the at least one modulated Doppler invariant signal comprises generating a plurality of separable Doppler invariant signals.

23. The method of claim 22, wherein providing the plurality of separable Doppler invariant signals comprises generating a plurality of orthogonal Doppler invariant signals.

24. The method of claim 23, wherein generating the plurality of orthogonal Doppler invariant signals comprises generating the plurality of orthogonal Doppler invariant signals using at least one of a Maximal sequence and a Kasami sequence.

25. The method of claim 22, wherein generating the plurality of separable Doppler invariant signals comprises generating the plurality of separable Doppler invariant signals substantially simultaneously.

26. The method of claim 22, wherein generating the plurality of separable Doppler invariant signals comprises generating the plurality of separable Doppler invariant signals with a time delay between each of the plurality of separable Doppler invariant signals.

27. The method of claim 17, further comprising determining at least one distance from the source to the receiver using the at least one propagation time delay.